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A COMPARISON OF ECONOMIC LOSSES DUE TO CALF ENTERITIS AND CALF PNEUMONIA IN NORTHERN SCOTLAND

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Des données détaillées sur les foyers de diarrhées et de pneumonie des veaux ont été recueillies par questionnaire sur une partie des élevages participant au programme de santé suivi par des vétérinaires praticiens libéraux dans le nord de l'Ecosse. Les services du SAC (Scottish Agricultural College) ont réalisé l'analyse avec l'objectif de promouvoir la médecine préventive et de justifier l'augmentation des dépenses par rapport à la diminution des pertes liées aux maladies. Cet article présente les premiers résultats d'un jeu de données des dépenses en comparaison aux pertes totales causées par les deux syndromes. Il apparaît que, dans le nord de l'Ecosse, un foyer moyen de diarrhée des veaux conduit à des pertes 50% plus élevées que celles causées par un foyer moyen de pneumonie des veaux. L'analyse détaillée de chaque type de perte est également fournie et ces résultats sont contrastés.

Vingt vétérinaires praticiens ont suivi 212 foyers de diarrhée qui ont compté 3619 veaux malades par rapport aux 7574 veaux à risque. La moyenne des pertes totales a été estimée à 32,92 livres £ (330 FF) par veau à risque avec un maximum de perte de 154,45 livres (1550FF). L'analyse détaillée des pertes moyennes indique que les coûts d'opportunité du travail constituent la plus grande part de ces coûts (35%) avec les coûts vétérinaires (27%) et la mortalité des veaux (19%).

Neuf de ces praticiens ont également enregistré l'information concernant 152 foyers de pneumonie qui ont compté 2607 veaux ayant une pneumonie sur les 7976 veaux à risque. La moyenne des pertes totales pour 1 foyer de pneumonie a été de 20,58 livres (206FF) par veau à risque avec un coût de 113,97 livres (1140 FF) pour le cas le plus grave. Une analyse détaillée de ces pertes a montré que les coûts vétérinaires constituent la part la plus importante de ces pertes (36%) avec les conséquences à long terme sur les survivants (36%) mais la mortalité n'a correspondu qu'à 14% de pertes totales.

INTRODUCTION

Cattle production in the North of Scotland is predominantly suckled beef (cow-calf) but there are also some specialist fattening units and dairy herds. In response to survey questions, veterinary surgeons working in practice in the area considered calf enteritis complex to be the most important disease of cattle; excluding B.S.E.. Calf pneumonia complex was considered to be the next most important disease.

Subsequently, as part of an EC sponsored Cattle Health Programme for the North of Scotland, the Scottish Agricultural College (SAC) Veterinary Services, undertook to estimate the losses due to both calf enteritis and calf pneumonia. The purpose of this was to try to justify and promote farmer expenditure on preventive health strategies rather than reliance upon therapy and prophylactic drug administration.

The study was veterinary practice based. Outbreak details were recorded by each veterinary practice using questionnaires. All significant outbreaks would have involved the veterinary practice for either consultation or drug supply. The preliminary results have already been presented to farmers.

Although the economic and epidemiological appraisals are ongoing we are able to present interesting results to this conference by summarising these data. Areas of loss are identified and the magnitude of those losses presented and compared for calf enteritis and calf pneumonia. It appears that the veterinary practitioners were correct in their assessment and that calf enteritis is on average the more important disease in economic terms.

MATERIALS AND METHODS

Twenty veterinary practices in the North of Scotland recorded disease outbreak details using questionnaires. All the cattle farms served by each practice were included in the study. Data about every outbreak occurring during each nominated study period were collected. Incidence data were derived from these preliminary surveillance results and economic estimates were derived from more detailed summary surveillance questionnaires which were subsequently completed for a proportion of outbreaks.

Practices were permitted to select the most appropriate surveillance period dependent upon local conditions. Enteritis outbreak information was recorded over one period but each practice was asked to record pneumonia data over two consecutive years. As a general rule pneumonia information was recorded during the late autumn and winter whereas enteritis data was recorded during the late winter and spring, but there were exceptions. Areas of loss for enteritis and pneumonia appear in Tables 1 and 2 respectively.

Veterinary losses were simply recorded under the two headings "drugs" and "other veterinary costs". All the drug usage could be derived from veterinary bills. The other veterinary costs included veterinary time, call out fees and laboratory charges. The methods of recording were the same for both diseases.

Other financial assumptions were based on gross margin information published by SAC (1994). Mortality was considered to be the cost of a dead calf. This was fixed at £160 for the first eight weeks of life and thereafter was £1.30 per kg based upon standard weight for age figures.

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An outbreak of bovine enteritis or pneumonia will require the attention of farm labour to the detriment of other more gainful activities i.e. there is an opportunity cost of farm animal disease which must be accounted for. In the case of pneumonia, farm staff were assumed to spend 0.25 hours per day in activities associated with the disease. The figure for enteritis was assumed to be 0.5 hours per day. An additional 0.25 hours (0.5 hours for enteritis) per day was allocated per morbid calf to allow farm staff to monitor and treat individual cases. For each calf that died of enteritis, a further time allowance of 14 hours (two 30 minute sessions per day for one week) was added for a replacement calf to be fostered (Stott and Gunn, 1995). Calves that died of pneumonia were normally too old to precipitate such action. Total farm staff time was accumulated from these three sources for the recorded duration of the outbreak. Their time was costed at £1 per hour.

The opportunity cost for capital represents the effect that the other losses have on the capital status of the business. This capital is either borrowed and incurs interest charges or depresses savings and therefore reduces invested income. The sum of losses (excluding the opportunity costs of labour) was calculated for each outbreak and a capital charge of 10% applied to half the total. This penalty was constant for both groups.

Loss in physical performance due to pneumonia was based on Thomas et al (1978). For pneumonia the throughput loss was the reduction in gross output from the calf enterprise due to calves taking longer to finish. The veterinary surgeon assessed the outbreak effect upon performance as mild (zero liveweight depression), moderate (depressed liveweight and lowered output by £7.00 per head) or severe (depressed liveweight and lowered output by £15.00 per head). This severity cost was multiplied by the number of calves considered at risk in each outbreak.

A further area of loss for pneumonic calves was the extra feed consumed by a morbid calf to reach the same slaughter weight as its peers. This was calculated from the veterinary surgeons assessment of the outbreak as mild (extra feed valued at £0), moderate (extra feed valued at £10) and severe (extra feed valued at £20). This value was multiplied by the number of morbid calves to derive the additional feed cost. These net feed cost effects of pneumonia were derived using a least cost diet formulation computer programme (SAC, 1995).

For calves with enteritis no throughput or feed losses were calculated. Instead a loss in calf value was calculated. This was derived from the veterinary surgeons assessment of the severity of the outbreak. For each morbid calf the depression in market value due to poor conformation at sale was calculated, in pence per kg, for mild (0), moderate (0.05) and severe (0.1) outbreaks. In addition the depression in weight gain was calculated for each morbid calf, in kg per day, for mild (0), moderate (0.25) and severe (0.5) outbreaks.

RESULTS

Twenty veterinary practices monitored 212 enteritis outbreaks which involved 3619 morbid calves from 7574 considered at risk. The average total loss was estimated at £32.92 per calf at risk with a maximum loss of £154.45. A breakdown of those losses is provided in Table I. Nine of those practices also recorded information for 152 pneumonia outbreaks which involved 2607 pneumonic calves from 7976 considered at risk. The average total loss for pneumonia outbreaks was £20.58 per calf at risk with £113.97 for the worst case. A breakdown of those losses is provided in Table II. Obviously the loss per affected calf was much higher.

Table I
Losses associated with calf enteritis outbreaks, calculated per calf at risk (£)

Area of loss	Minimum loss	Average loss	Maximum loss
Extra veterinary costs	0.13	8.75	55.01
Calf mortality	0.00	6.31	56.00
Opportunity cost of labour	0.08	11.48	76.38
Opportunity cost of capital	0.02	0.53	2.31
Loss in calf value	0.00	5.85	35.34
TOTAL	0.85	32.92	154.45

Table II
Losses associated with calf pneumonia outbreaks, calculated per calf at risk (£)

Area of loss	Minimum loss	Average loss	Maximum loss
Extra veterinary costs	0.00	7.44	83.47
Calf mortality	0.00	2.92	32.00
Opportunity cost of labour	0.00	1.92	15.50
Opportunity cost of capital	0.01	0.89	5.37
Throughput loss	0.00	4.27	15.00
Additional feed costs	0.00	3.13	20.00
TOTAL	0.25	20.58	113.97

DISCUSSION

The preliminary results from this study indicate that the veterinary surgeons were correct in their conclusion that calf enteritis represents a greater area of economic loss compared to calf pneumonia for farms in their region. The losses were presented per calf at risk so that farmers could easily assimilate the potential financial implications of an outbreak. On average, losses associated with an enteritis outbreaks are 50% greater than for pneumonia outbreaks. However the type of animal involved in these outbreaks is different. Enteritis involves neonatal calves reaching store weight at sale but pneumonia usually involved weaned calves being fattened and going to slaughter between 18 or 24 months of age. Surprisingly then, despite the mortality described for RSV pneumonia outbreaks, and despite the much greater intrinsic value of the older pneumonic calves the economic losses associated with calf mortality were 50% higher for enteritis outbreaks.

There is a general reliance on prophylactic administration of expensive, long acting antibiotics and anti-inflammatory drugs to control pneumonia outbreaks in older calves. Despite this, average veterinary costs were greater for the neonatal enteritis outbreaks. Certainly those involved more veterinary time administering intravenous fluids and treating serious illness whereas there was little veterinary involvement in pneumonia outbreaks. Although on average the veterinary costs made up a greater proportion of the loss it was only in the worst pneumonia outbreaks that veterinary costs exceeded those for enteritis for each calf at risk.

The opportunity cost for capital must be greater for most enteritis outbreaks, however a few very serious pneumonia outbreaks resulted in the average capital cost being greater for pneumonia. In neither disease is this a large part of the total loss. However the opportunity cost of labour is the biggest single area of loss for enteritis but it is only a small fraction of the loss for most pneumonia outbreaks: this is a function of the much more intensive nursing that neonatal calves with enteritis require.

It has been recognised that opportunity cost is a substantial proportion of farm animal disease losses and yet it has seldom been acknowledged in previous studies (McInerney, 1996). Failure to appreciate its significance may cause farmers to underestimate the total economic impact of farm animal disease leading to inadequate and/or inappropriate control measures. The constants used here in order to estimate the opportunity cost of bovine enteritis and pneumonia were based on discussions with the farmers and veterinarians directly involved with the recorded outbreaks. It is recognised that these constants are estimated averages per morbid calf for the recorded duration of the outbreak and will vary in practice between calves, between outbreak and throughout the duration of the outbreak. Even so, the times and opportunity costs produced were verified by the farmers and veterinarians concerned. The apparently low opportunity cost of farm staff time (£1/hour) reflects the heavy reliance on family labour in most farming situations.

The long term effects of disease on survivors was measured by loss in calf value for enteritis and by combining throughput with additional feed costs for pneumonia. These effects were probably greater for pneumonia because calves were affected at an older age and remained on farm for longer subsequent to disease.

Although not all the costs reported here will be avoidable (McInerney, 1996) both diseases can result in such large losses that they often easily justify expenditure on preventive measures for recurrently affected farms. When such losses were presented it was hoped that farmers would be motivated to redirect their scarce resources and shift the balance away from disease. Such measures suggested included the adoption of proper vaccination programmes where proven vaccines exist. Modification of badly designed buildings to try to reduce the severity of pneumonia outbreaks might be justified when the full extent of losses are considered. Other management changes involving an increased demand for labour might be indicated if greater labour requirements for treatments could subsequently be avoided. These presentations were well received by farmers (Gunn and Stott, 1996) when presented with welfare arguments to promote the prevention of disease.

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